

## CLAIM

1. An orthogonal frequency multi-carrier transmitting apparatus which  
arranges plural symbols to be transmitted on the frequency axis as plural  
5 sub-carrier signal components of a frequency interval equal to the symbol rate,  
then converts them to time domain signals, then up converts these signals and  
amplifies their power, thereafter transmitting them, comprising:

an inverse Fourier transform part which transforms said plural  
sub-carrier signal components to plural time domain signal components;

10 a peak component detecting part which compares each of said plural  
time domain signals with a predetermined permissible peak level to detect  
peak components exceeding said permissible peak level;

a Fourier transform part which transforms said peak components to  
frequency domain components corresponding to said sub-carrier signal  
15 components; and

subtracting means which subtract said frequency domain components  
from said plural sub-carrier signal components to be input to said inverse  
Fourier transform part, thereby suppressing the peak component of the  
transmitting output.

20 2. The orthogonal frequency multi-carrier transmitting apparatus as  
recited in claim 1, wherein said peak component detecting part sets said peak  
components at zero when the levels of the time domain signal components  
output from said subtracting means are equal to or lower than said permissible  
peak level, and uses the differences between said time domain signal  
25 components and said permissible peak level as said peak components when  
the levels of said time domain signal components exceeds said permissible  
peak level.

3. The orthogonal frequency multi-carrier transmitting apparatus as recited in claim 1, wherein a permissible peak level setting part is provided which determines said permissible peak level in accordance with the level of the power-amplified transmitting signal.

5           4. The orthogonal frequency multi-carrier transmitting apparatus as recited in claim 1 or 3, which further comprises a Fourier-transformed output signal control part which compares the level of each of said frequency domain components from said Fourier transform part with a predetermined peak-reduced signal permissible level, and controls the level of said each  
10 frequency domain component to become equal to or lower than said peak-reduced signal permissible level.

5. The orthogonal frequency multi-carrier transmitting apparatus as recited in claim 1, which further comprises:

          plural copying parts each of which copies one of said plural symbols  
15 to a number SF that is equal to the value of a spreading factor, said SF being an integer equal to or greater than 1;

          a spreading code generating part which generates spreading codes; and  
          multiplying means which spread the outputs from said plural copying parts by said spreading codes and outputs the spread results as said plural  
20 sub-carrier signal components.

6. The orthogonal frequency multi-carrier transmitting apparatus as recited in claim 1, which further comprises:

          plural copying parts each of which copies one of plural symbols to a number SF that equal to the value of a spreading factor, in each of plural  
25 routes to which plural symbols are input, said SF being an integer equal to or greater than 1;

          a spreading code generating part which generates a spreading code for

each route;

multiplying means which spread the outputs from said plural copying parts of each route by said spreading code; and

5 a combining part which combines corresponding components of the outputs from the respective multiplying means of said plural routes and outputs the combined components as sub-carrier signal components of said plural routes.

7. The orthogonal frequency multi-carrier transmitting apparatus as recited in claim 6, wherein said spreading code generating part generates a  
10 short code as said spreading code; said transmitting apparatus further comprising:

a long code generating part which generates a long code; and  
second multiplying means which multiply the outputs from the combining part by said long code and output multiplication results as said  
15 plural sub-carrier signal components.

8. The orthogonal frequency multi-carrier transmitting apparatus as recited in any one of claims 1 to 7, wherein a set of said inverse Fourier transform part, said peak component detecting part, said Fourier transform part and said subtracting means is formed by a memory in which there are  
20 stored time domain signal components that are obtained when peak reduction processing by said inverse Fourier transform part, said peak component detecting part, said Fourier transform part and said subtracting means is performed in advance for each possible combination of the respective sub-carrier components until peak components become equal to or lower than  
25 said permissible peak level.

9. An orthogonal frequency multi-carrier transmitting method which arranges plural symbols to be transmitted on the frequency axis as

plural sub-carrier signal components of a frequency interval equal to the symbol rate, then converts them to time domain signals, then up converts these signals and amplifies their power, thereafter transmitting them, comprising:

5           (a) a step of performing inverse Fourier transform processing of said plural sub-carrier signal components to transform them to plural time domain signal components;

             (b) a step of comparing each of said plural time domain signal components with a predetermined permissible peak level to detect peak  
10 components exceeding said permissible peak level;

             (c) a step of Fourier-transforming said peak components to frequency domain components corresponding to said sub-carrier signal components; and

             (d) a step of subtracting said frequency domain components from said plural sub-carrier signal components to thereby suppress the peak component  
15 of a transmitting output.

10. The orthogonal frequency multi-carrier transmitting method as recited in claim 9, wherein said steps (a), (b) and (c) are repeatedly performed until the levels of all of said plural time domain signal components become equal to or lower than said permissible peak level in said step (b).

20           11. The orthogonal frequency multi-carrier transmitting method as recited in claim 9, wherein the time domain signal components corresponding to said sub-carrier signal components are read out from a memory in which there are stored time domain signal components that are obtained when peak reduction processing by said steps (a), (b), (c) and (d) is performed in advance  
25 for each possible combination of the respective sub-carrier components until peak components become equal to or lower than said permissible peak level.